

**Assessment 2: Case study analysis**

**Report**

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## Issue 1: Determine current average pricing of the accommodation by brands, states, and locations.

### The procedure

I used and rearranged a pivot table to find the requested information.

### Conclusion

##### Resort

The 144 Hotels have been classified by brand, divided into 3 groups of 48. The average price of Resort brand hotels is $200, $203 for Cottage brand, and $201 for the Classic brand.

##### Cottage

The 144 Hotels have been classified by states, separated into 3 groups of 48. The average price of hotels in NSW state is $201, $202 for QLD state, and $201 for VIC state.

##### Classic

The 144 Hotels have been classified by location, divided into 2 groups of 72. The average price of hotels located in metropolitan cities is $202, and $201 for those located in regional cities.

## Issue 2: Determine whether price differentiation exists among the accommodation brands.

### The procedure

I sorted the data into three columns by brand name and used a one-way ANOVA with the Tukey-Kramer procedure to test the hypothesis.

### Conclusion

According to the analysis of variance, the null hypothesis is rejected because of the p-value (0.001063) < α (0.05). The average price of the three accommodation brands is different.

According to the Tukey-Kramer procedure, we observe that there are no (or a negligible) price differences between the Resort/Classic means (absolute difference 1.192292 < critical range 1.472427), and the Cottage/Classic means (absolute difference 1.193542 < critical range 1.472427). However, the test considers that there is a price difference between the Resort and Cottage means (absolute difference 2.385833 > critical range 1.472427). Based on these results, it can be concluded that Mr. Oscar is right, because the brand factor has an influence on the price.

## Issue 3: Determine whether price differentiation exists between states among the accommodation brands.

### The procedure

I sorted the data into three columns by brand name, and 48 rows by states. I used a two-way ANOVA to test the hypothesis.

### Conclusion

According to the analysis of variance:

* h0 row is not rejected because p-value row (0.129) > α (0.05)
* h0 column is rejected because p-value column (0.001039) < α (0.05)
* h0 interaction is not rejected because p-value interaction (0.620017) > α (0.05)

This means that there are no price differences between states, there is a price difference between brands, and there are no interactions between the two factors, brands and states. Based on these results, it can be concluded that the state factor has no influence on the price.

## Issue 4: Determine whether price differentiation exists between locations among the accommodation brands.

### The procedure

I sorted the data into three columns by brand name, and 48 rows by locations. I used a two-way ANOVA to test the hypothesis.

### Conclusion

According to the analysis of variance:

* h0 row is not rejected because p-value row (0.707385) > α (0.05)
* h0 column is rejected because p-value column (0.000991) < α (0.05)
* h0 interaction is not rejected because p-value interaction (0.10775) > α (0.05)

This means that there are no price differences between locations, there is a price difference between brands, and there are no interactions between the two factors, brands and locations. Based on these results, it can be concluded that Mr. Oscar is wrong, because the location factor has no influence on the price.

## Issue 5: Determine if the introduction of the Comfort brand has increased internal competition among the other accommodation brands.

### The procedure

I removed all the rows without a comfort value, created a new table sorted by brands and comfort value.

I did a two ways ANOVA on this table, to know if the comfort characteristic has an influence or not on the price.

To test competition between comfort / without comfort inside a brand, I did three different tables, one for each brand. Each table is divided into two columns: comfort and no comfort. We have 32 values per table, 16 for each column. I did a z-test and a t-test on each table to test hypothesis.

### Conclusion

##### Two-ways ANOVA

According to the analysis of variance:

* h0 row is rejected because p-value row (0.0000439753) < α (0.05)
* h0 column is rejected because p-value column (0.002394355) < α (0.05)
* h0 interaction is not rejected because p-value interaction (0.095208301) > α (0.05)

This means that there is a price difference between brands, there is a price difference between comfort / no comfort, and there are no interactions between the two factors, brands and comfort. Based on these results, it can be concluded that the comfort factor has an influence on the price.

##### Resort

According to the statistical hypothesis tests, h0 is rejected because:

* t-test p-value one-tail (0.005117843) < 0.05
* t Stat (-2.797199163) < t Critical one-tail (1.713871528)
* z-test p-value one-tail (0.00257739) < 0.05
* Z (-2.7971992) < z Critical one-tail (1.614485363)

This means that there is a price difference, between the resort with comfort and resort without comfort, and that resort with comfort is less expensive. Based on these results, it can be concluded that hotels resort with comfort is less expensive than hotels resort without comfort.

##### Cottage

According to the statistical hypothesis tests, h0 is not rejected because:

* t-test p-value one-tail (0.150607898) > 0.05
* z-test p-value one-tail (0.14575599) > 0.05

According to the statistical hypothesis tests, h0 is rejected because:

* t Stat (-1.054810551) < t Critical one-tail (1.70561792)
* Z (-1.05481053) < z Critical one-tail (1.64485363)

The P-value approach and the Critical value approach do not give the same result. The P-value approach does not reject h0 in both tests, and the Critical value approach rejects it. Based on these results, it can be concluded that hotels classic with comfort are less expensive than hotels classic without comfort. Based on these results, we can conclude thatthe price difference between Cottage with comfort and Cottage without comfort is negligible. However, the price of Cottage with comfort is slightly lower than the price of Cottage without comfort.

##### Classic

According to the statistical hypothesis tests, h0 is rejected because:

* t-test p-value one-tail (0.001314) < α (0.05)
* t Stat (-3.2807081) < t Critical one-tail (1.69726089)
* z-test p-value one-tail (0.000517734) < α (0.05)
* Z (-3.28070814) < z Critical one-tail (1.644853627)

This means that there is a price difference, between classic with comfort and classic without comfort, and that classic with comfort is less expensive. Based on these results, it can be concluded that hotels classic with comfort are less expensive than hotels classic without comfort.

##### Global results

The introduction of the comfort brand has increased internal competition in the Resort and Classic brands, but not in the Cottage brand.